



USAMRIID researchers are currently working to develop improved vaccines against anthrax and several other diseases.

WEEKS after the deadly terrorist attacks on the World Trade Center in New York City and the Pentagon in Washington, D.C., politicians and military officials in the United States dealt with a bizarre new aspect of homeland defense — a series of actual and possible biological attacks involving anthrax.

Their concerns were not unfounded. Several of the terrorists involved in the Sept. 11 attacks had shown a peculiar interest in the capabilities of cropduster aircraft to disperse large amounts of chemicals over wide areas.

A few weeks after the attacks — almost as though U.S. speculation about a possible chemical-biological attack on America could have caused it to happen — letters containing powdery substances started turning up at five different locations across the country.

Bob Stevens, a photo editor at American Media Inc., in Boca Raton, Fla., was the first person to be diag-

The Anthr

Story by Heike Hasenauer

nosed with, and eventually die from, the disease.

Medical officials, FBI investigators and postal workers quickly reacted as America was challenged by the first real test of its ability to respond to chemical-biological warfare on the homefront.

In subsequent days, anthrax-contaminated letters targeted network news studios in New York, affecting assistants to CBS news anchor Dan Rather and NBC news anchor Tom Brokaw. Aides to Senate Majority Leader Tom Daschle were also exposed to anthrax as the tainted mail reached offices on Capitol Hill.

Work at the affected sites temporarily ceased as FBI agents swept entire buildings for contaminants and clues that could lead them to the perpetrators.

The House of Representatives shut down for five days and hundreds of people lined up to be tested and receive doses of antibiotics.

As department heads and supervisors around the country issued warnings and published procedures to safeguard those who handle mail, the U.S. Army Medical Research Institute of Infectious Diseases at Fort Detrick, Md., became involved.

Scientists with USAMRIID's

U.S. military officials fully realized the services' vulnerability to chemical-biological agents during the Gulf War, when Saddam Hussein threatened to use such weapons against coalition forces. At that time, 150,000 U.S. troops were vaccinated against anthrax. .



AP/Wideworld photo (both)



(Above) Capitol Hill employees wait to be tested at the Hart Senate Office Building in Washington, D.C., a day after mail delivered to the facility tested positive for anthrax.

(Left) After one anthrax fatality and several exposures in Florida, state agencies began testing suspicious packages. Here a Florida Department of Agriculture employee swabs a sample onto a culture dish to test for the presence of anthrax.

ax Threat

Diagnostic Systems Division performed diagnostic tests for bacillus anthracis, the agent that causes anthrax, said Chuck Dasey, a spokesman for the U.S. Army Medical Research and Materiel Command, to which USAMRIID belongs.

The laboratory routinely tests medical and environmental samples in support of public-health and law-enforcement agencies. USAMRIID's primary mission is to develop medical countermeasures — including vaccines, diagnostics, therapeutics and information to protect service members from biological threats and naturally occurring infectious diseases.

USAMRIID researchers are currently working to develop improved anthrax vaccines, and vaccines against Venezuelan equine encephalitis and botulism, among others. The institute also assists the World Health Organization and the Centers for Disease Control in the investigation of unusual disease outbreaks.

In October, USAMRIID scientists, civilian health professionals, FBI investigators and others dealt with an outbreak of another kind — not contagious and not usually deadly, but purposely planted by terrorists intent on disrupting the day-to-day operations of well-chosen groups.

Over a two-week period in October, the FBI investigated some 2,300 anthrax hoaxes, the agency reported.

But not all occurrences were hoaxes. Soon after the Centers for Disease Control in Atlanta, Ga., reported two documented cases of anthrax in Florida, a third case in that state was identified. And by Oct. 21, the CDC reported that nine people had contracted the disease and 32 others had tested positive for anthrax exposure — meaning anthrax spores had been found in their nasal passages. Three of the cases were inhalation anthrax, the most deadly kind.

Most of those exposed — 28 of the 32 at press time — worked in offices on Capitol Hill, said Deputy Surgeon General Dr. Kenneth Moritsugu. CDC officials at the same time made clear that the finding did not mean those people had the disease or would develop it.

Most disturbing, perhaps, was the Oct. 30 inhalation anthrax death of a New York City hospital worker with no known connection to any of the



Heike Hasenauer

Soldiers' health is monitored closely throughout their careers, and the anthrax vaccination program is another way in which combat readiness and individual health are assured.

closely with Pennsylvania Gov. Tom Ridge, who directs the newly created Homeland Security Office.

President George W. Bush charged that office with the critical task of hammering out a plan to defeat terrorist threats in the United States — among them, the chemical-biological warfare threat.

"I don't want to get into the details," White told reporters Oct. 12 after meeting with Ridge

for the first time. He did say, however, that the military's role would be to support the "11 million civilian first-responders in the United States who deal primarily with emergencies.

"We have units that are capable of dealing with chemical, biological and nuclear devices," said White, who, as Army secretary, is responsible for ensuring soldiers are appropriately trained and ready to defend America. He's also responsible for how soldiers are used to defend the homefront.

U.S. military officials released little information about which soldiers and units would be vaccinated against anthrax, to preclude identifying specific units deployed to Pakistan and Uzbekistan. The Central Asian nations are staging areas for U.S. forces supporting operations against Afghanistan, the country harboring prime terrorist suspect Osama bin Laden.

But LTC John Grabenstein, deputy director of the Anthrax Vaccine Immunization Program Agency and a member of the Operations Directorate in the Office of the Surgeon

General, said: "Soldiers going to a threat area will be vaccinated against anthrax."

He said the June 2001 Defense Department anthrax policy is unchanged. For complete policy information, go to www.anthrax.osd.mil.

Tens of thousands of U.S. soldiers were vaccinated during the Gulf War. And in 1998 Defense Secretary William Cohen approved a plan to vaccinate all soldiers, including those in the Reserve and National Guard, against anthrax.

Anthrax vaccinations, currently available only to military members, were limited to "designated special-mission units, a very small number of highly specialized people," Grabenstein said of the anthrax-vaccination situation in the Army in October 2001.

Each dose of the vaccine, given in six shots over an 18-month period, followed by an annual booster shot, "is like walking up a set of steps; complete coverage comes only after the sixth step," Grabenstein said. "But soldiers can be sure they are protected. Each dose allows the body to continue to



Heike Hasenauer

By knowing and practicing proper NBC procedures, soldiers give themselves an edge should they face anthrax or other biological and chemical threats.

previous infection sites. At press time, she was the fourth person to die from the more virulent pulmonary form of the disease.

Despite the deaths, agency officials attempted to put the anthrax threat into perspective.

"Some 20,000 people die from the flu every year," one official said. "And inhalation anthrax is so rare that it's been seen only 18 times in this country in the last 100 years."

Nonetheless, U.S. officials didn't want to be caught unprepared for a potential widespread anthrax attack. Health and Human Services Secretary Tommy Thompson asked Congress to allocate \$600 million to build the U.S. supply of Ciprofloxacin, the antibiotic most often used to thwart the disease. Thompson also asked for \$500 million to replenish the U.S. supply of small-pox vaccine.

Meantime, Bayer, the pharmaceutical giant that manufactures Cipro, operated its factories around the clock to produce 15 million of the tablets per day, a Bayer official said. The aim was to provide enough of the antibiotic to treat as many as 12 million people for 60 days.

On Oct. 2, Secretary of the Army Thomas E. White was named the Defense Department's interim executive agent for homeland security, a position that would allow him to work

develop antibodies. So each shot is beneficial.”

The vaccine, called Anthrax Vaccine Adsorbed, AVA, is a “cell-free filtrate, produced from a strain of anthrax that does not cause disease,” DOD officials said.

AVA for humans was developed in the United States in the 1950s and 1960s, and was licensed by the U.S. Food and Drug Administration in 1970. Since then, it’s been “safely and routinely administered to wool-mill workers, veterinarians, laboratory workers, livestock handlers and U.S. service members,” FDA officials said.

To date, no long-term side effects have been reported, nor have studies of “Gulf War Illness” found any correlation between it and the vaccine, DOD officials said.

One in about 200,000 people may experience side effects serious enough to result in hospitalization, according to a CDC report. About one in 100,000 experience an allergic reaction.

The vaccine works by preventing the anthrax bacteria from growing and producing toxins that lead to the disease, Dasey said.

In tests of rhesus monkeys that were exposed to inhalation anthrax, even a partial dose of the vaccine was effective at preventing the disease for as long as two years, according to a recent USAMRIID report.

USAMRIID has one of only a few maximum biological containment facilities in the United States and can therefore study deadly viruses, such as two strains of Ebola — Ebola-Zaire and Ebola-Sudan. USAMRIID won acclaim as the laboratory involved in testing hundreds of imported Philippine monkeys that died of a 1989 Ebola outbreak in an animal quarantine facility in Reston, Va.

Researchers discovered that the particular strain of Ebola — which became known as Ebola-Reston — does not cause disease in humans. Although four employees of the quarantine facility became infected with the virus, none became ill.

That outbreak — and the professionals involved in removing monkey carcasses and performing autopsies,

Knowing the Enemy

CHEMICAL and biological weapons expert Jonathan B. Tucker, author of “Scourge: The Once and Future Threat of Smallpox,” said in a recent Time magazine interview that once the inhaled anthrax bacteria enters the body, it travels into the tiny air sacs in the lungs, where it lodges and disseminates.”

The bacteria then produce toxins that cause the illness in the host. “First you see nonspecific flu-like symptoms. Then, in hours or in a few days, some patients will have a brief period of recovery,” Tucker said. “Others progress directly to the second stage of the disease, which generally leads to shock, massive swelling of lymph nodes and hemorrhagic meningitis [bleeding in the brain].”

While the incidence of inhalation anthrax is rare, CDC officials said, the spores are long lasting. The incubation period for onset of the disease is short, and disability is severe. Ninety percent of its victims die. This is, therefore, the form of anthrax most often studied by chemical-biological threat experts.

Cutaneous anthrax — the type transmitted through a break in the skin — manifests itself as skin lesions. If left untreated, this form of the infection may spread into the bloodstream and cause shock and, finally, death. While 95 percent of the world’s anthrax cases are cutaneous, the chance of dying as a result of this form of the disease is about one in 100,000, CDC officials said.

Neither form of the disease is contagious and both can be treated in their early stages, medical experts said. But, again, inhalation anthrax is usually fatal, even when a victim has been treated with antibiotics.

Symptoms of anthrax generally occur one to six days after exposure, CDC officials said. But they can occur as early as 24 hours or as late as seven weeks after the victim has inhaled bacteria-infected spores.

Fueling the flames of anxiety over anthrax is the fact that it’s difficult to diagnose, because it starts off like a respiratory illness with vague symptoms. Then it progresses rapidly, causing fever, coughing and overall weakness. Difficulty breathing, shock and death follow, CDC experts said. — *Heike Hasenauer*

basically risking their own lives to protect the population at large — was the basis for the bestselling book “The Hot Zone.”

U.S. military officials fully realized the services’ vulnerability to chemical-biological agents during the Gulf War, when Saddam Hussein threatened to use such weapons against coalition forces. At that time, 150,000 U.S. troops were vaccinated against anthrax, said Lyn Kukral, a spokeswoman for the Office of the Surgeon General.

Anthrax tops DOD’s list of biological warfare agents for another reason;

the virus is tough to kill, said Dr. Graham Pearson, head of Britain’s chemical and biological defense establishment during the Gulf War.

Most microorganisms die quickly when exposed to sunlight or high temperatures, Pearson said, but anthrax can survive boiling water and has been known to live in contaminated soil for decades.

Normally associated with plant-eating animals, especially livestock, the virus is controlled through animal-vaccination programs, but still occurs in countries where animals are not vaccinated, chiefly in Africa, Asia and the Middle East, CDC officials said. □

